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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/721,500	11/26/2003	Steven T. Fink	245339US6YA	6213

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EXAMINER	
MACARTHUR, SYLVIA	
ART UNIT	**PAPER NUMBER**
1763	

DATE MAILED: 11/21/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

C

Office Action Summary	Application No.	Applicant(s)	
	10/721,500	FINK ET AL.	
	Examiner	Art Unit	
	Sylvia R. MacArthur	1763	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *05 September 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-14 and 16-23* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-14 and 16-23* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *26 November 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Request for Continued Examination (RCE)

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 9/5/2006 has been entered.

Response to Arguments

2. Applicant's arguments with respect to claims 1-14 and 16-23 have been considered but are moot in view of the new ground(s) of rejection. Amended claim 1 recites that the thermally zones holder has a) a base upper section, b) the bottom surface has a recess formed therein, c) that the temperature control elements have a top surface seated in the recess and d) a bottom surface forming a floor of said recess (interpreted as an indentation/alcove). The newly amended claim 1 also has includes a limitation for e) the thermal insulator being positioned with the recess and the holder has a base lower portion positioned within the recess and seated to the floor of the recess to substantially fill the recess.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 1-8, 11, 12, and 23 are rejected under 35 U.S.C. 102(e) as being anticipated by Benjamin et al (US 6,847,014).

Claim 1: Benjamin et al (US 6,847,014) teaches an apparatus for controlling the temperature of a workpiece using a lateral thermal break, see Fig. 5. The thermally zones substrate holder /base 502 comprises an upper portion with a top surface (flat support 506) and a lower portion positioned within the recess and seated to the floor of the recess to fill the recess.. The bottom surface of the holder has a recess formed therein wherein a plurality of temperature control elements are present see T1 and T2. Thermal insulators 510 are provided with the recess and disposed between temperature control elements T1 and T2.

Claim 2: Col. 6 lines 46-55 teaches that a dual or multiple manifold heat sink is used to circulate a temperature controlled fluid. Thermal insulators 510 separate the heat sink into a plurality of zones, see col. 6 lines 55-64.

Claim 3: Fig.4B of Benjamin et al illustrates the flow of heater power is circular in the plane of the top surface of the substrate holder. The difference between this illustrated embodiment and that of Fig.5, the temperature control elements are based upon fluid flow instead of heater coils, see col. 6 lines 12-63.

Claim 4: The fluid flow is concentric about a central axis of the substrate holder see Figs. 4B and 5.

Claim 5: At least one insulator 510 is concentric with the fluid flows see Fig. 5.

Claims 6 and 7: Col. 6 lines 46-63 teaches the temperature zones comprise heating elements or heat sinks with fluid flow.

Claim 8: Fig. 4B illustrates an insulator 404 is concentric with each heating element.

Claim 11: The temperature control elements are radially extending according to Fig.5..

Claim 12: Col. 6 lins 46-64 teach that the thermal insulators 510 azimuthally separate the base 502 into multiple zones.

Claim 23: The thermal insulation 510 is described in col. 6 lines 46-65 as a ceramic material.

5. Claims 1-13 and 21 are rejected under 35 U.S.C. 102(e) as being anticipated by Lee et al (US 6,753,272).

Regarding 1: Lee et al teaches a thermally zoned substrate holder 26, comprising:
a base upper portion having top and bottom surfaces, the top surface configured to support a substrate, see Fig.1. a plurality of temperature control elements D, R1, and R2 inside the base, each element having a top surface and a bottom surface; at least one insulator 42, having a lower coefficient of thermal conductivity than a material of the base, the at least one insulator being disposed between the plurality of temperature control elements and substantially thermally separating the plurality of temperature control elements.

Regarding claims 2-5: Fig. 2 illustrates a plurality of temperature control elements showing separate flows.

Regarding claim 6: The apparatus according to claim 1, wherein the plurality of temperature control elements each include at least one heating element (lamps) see col. 7 line 3 of Lee et al.

Regarding claim 7: The apparatus according to Claim 6, wherein each heating element is concentric about a central axis of the substrate holder, see Figs. 2 and 2A of Lee et al.

Regarding claim 8: The apparatus according to Claim 7, wherein the at least one insulator is concentric with each heating element, see Fig. 2 of Lee et al.

Regarding claim 9: The apparatus according to claim 1, further comprising temperature detectors 60 disposed at predetermined positions in the temperature control elements of Lee et al.

Regarding claim 10: The apparatus according to claim 2, further comprising temperature detectors 60 disposed at predetermined positions in the temperature control elements of Lee et al.

Regarding claim 11: The apparatus according to claim l, wherein the temperature control elements are radially extending, see Fig. 2 of Lee et al.

Regarding claim 12: The apparatus according to claim 1, wherein the temperature control elements comprise radially extending elements and azimuthally extending elements, see Figs. 2 and 2A of Lee et al.

Regarding claim 13: The apparatus according to claim 1, wherein the at least one insulator comprises a vacuum-filled chamber, see col. 7 lines 30-36 of Lee et al.

Regarding claim 21: Fig. 2A wherein zones Z_D, Z_1, and Z_2 correspond to temperature control element D, R1, and R2 respectively.

6. Claims 1-8, 11, and 12 are rejected under 35 U.S.C. 102(e) as being anticipated by Arai et al (US 6,664,738).

Regarding 1: Arai et al teaches a thermally zoned substrate holder S, comprising:

a base having top and bottom surfaces, the top surface configured to support a

substrate,, see Fig.2. a plurality of temperature control elements 11 and 12 inside the base, each element having a top surface and a bottom surface;

at least one insulator 13, having a lower coefficient of thermal conductivity than a material of the base, the at least one insulator being disposed between the plurality of temperature control elements and substantially thermally separating the plurality of temperature control elements, see Fig. 2.

Regarding claim 2: The apparatus according to claim 1, wherein first and second of the plurality of temperature control elements receive separate fluid flows, col. 2 lines 57-67.

Regarding claim 3: The apparatus according to claim 2, wherein at least one of the fluid flows is substantially circular in the plane of the top surface of the substrate holder, see Figs. 2-4.

Regarding 4: The apparatus according to claim 2, wherein the fluid flows are concentric about a central axis of the substrate holder, see Figs. 3 and 4.

Regarding claim 5: The apparatus according to claim 2, wherein the at least one insulator 13 is concentric with the fluid flows.

Regarding claim 6: The apparatus according to claim 1, wherein the plurality of temperature control elements each include at least one heating element, see col.4 line 50.

Regarding claim 7: The apparatus according to Claim 6, wherein each heating element is concentric about a central axis of the substrate holder, see Figs. 3 and 4

Regarding claim 8: The apparatus according to Claim 7, wherein the at least one insulator is concentric with each heating element 11/12, see Fig. 4

Regarding claim 11: The apparatus according to claim 1 , wherein the temperature control elements are radially extending, see Figs.3 and 4.

Regarding claim 12: The apparatus according to claim 1, wherein the temperature control elements comprise radially extending elements and azimuthally extending elements, see Figs. 1 and 2.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. Claims 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Benjamin et al or Arai et al in view of Lee et al.

Benjamin et al teaches temperature sensor 309 as recited in col. 5 lines 22-40 wherein sensors are associated with each heating zone. Benjamin et al further suggests that the temperature sensors can be mounted through ports to read from the workpiece or mounted within or to the back of the support.

Benjamin et al fails to teach temperature detectors at positions in the temperature control elements.

The teachings of Arai et al were discussed above. Arai et al fails to teach temperature detectors.

Recall Lee teaches temperature detectors 60 disposed at predetermined positions in the temperature control elements as illustrated in Fig. 3.

The motivation to modify the apparatus of Benjamin et al or Arai to position the temperature sensors (detectors) in the temperature control elements is to have a more accurate reading of the temperature according to Lee et al col. 10 lines 25-33. Thus, it would have been obvious for one of ordinary skill in the art at the time of the claimed invention to provide temperature detectors in direct physical contact with each temperature control element (zone) to allow precise temperature measurements of each region.

9. Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over the prior art of Benjamin et al, Lee et al, or Arai et al, henceforth referred to as *the primary prior art.*

The teachings of the primary prior art were discussed above.

All fail to teach the temperature control elements include a plurality of fins (this claim is interpreted as a reference of shape).

The shape of the temperature control elements being fins is a matter of optimization. It was held in In re Dailey, 357 F. 2d 669, 149 USPQ 47 (CCPA 1966) that the shape was a matter of choice which a person of ordinary skill in the art would have found obvious absent persuasive evidence that the particular shape was significant. Thus, it would have been obvious for one of ordinary skill in the art at time of the claimed invention to design the temperature control elements to include fins, that is to have a fin-shape.

10. Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Arai et al (US 6,664,738) alone as evidenced by the denotation of "rib" according to Answers.com.

The teachings of Arai et al were discussed above.

Arai et al fails to specifically teach that the insulator is solid.

Arai does teach that the slit whose function to suppress heat transfer can be reinforced by a rib. According to Answers. com a rib a piece of material used to reinforce or support its point of use. In this case, as Arai et al teaches in col. 8 lines 35-40 that the use of rib would be motivated by a need to prevent the rigidity of the support being sacrificed. Thus, it would have been obvious for one of ordinary skill in the art at the time of the claimed invention to utilize a rib in the slit of Arai in order to increase the rigidity of the support while providing the thermal insulation between the thermal control elements.

11. Claims 13, 14, 16-18, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Benjamin et al or Arai et al in view of Strang et al.

The teachings of Benjamin et al or Arai et al were discussed above.

Regarding claims 13 and 14: Benjamin et al or Arai et al fails to teach a gas filled chamber.

Strang et al teaches temperature control of susceptors wherein the heater and cooler are separated by a gas filled chamber (gap).

The motivation to provide the temperature control elements of Benjamin et al or Arai as a gas filled chamber is that the gas filled chamber ensures that the thermal conductance can be adjusted with the chamber with the emptying or filling of the chamber, thus affecting the level of thermal insulation between the temperature control elements, see the abstract of Strang et al.

Regarding claims 16 and 17: Cols. 10 and 11 of Strang et al teaches that varying the height or dimensions of the insulator serves to control the thermal conductance of the insulator and enhances thermal control. According to In re Woodruff, 16 USPQ2d 1934, it is obvious to

one of ordinary skill in the art to determine the optimum value of a cause effective variable such as the dimensions of the gas filled insulation chamber through routine experimentation.Thus, it would have been obvious for one of ordinary skill in the art at the time of the claimed invention to construct the gas filled chamber of Benjamin et al or Arai et al as modified by Strang et al to the optimal height to provide optimal thermal insulation between the thermal control elements, thus enhancing temperature control of the wafer.

Regarding claim 18: The gap body of Strang et al is made of quartz (a known reflective material). The motivation to provide a reflective surface is that it enhances the thermal conductance and thus affects the level of thermal insulation provided by the gap body. Thus, it would have been obvious for one of ordinary skill in the art at the time of the claimed invention to construct the gap body of Benjamin et al or Arai et al as modified by Strang et al with a reflective surface.

Regarding claim 19: Strang et al fails to teach the dimensions of the chamber. The motivation to modify the chambers of the *primary prior art to design the chamber with a height that will provide optimal thermal insulation between the thermal control elements of their respective substrate holders*.. According to In re Woodruff, 16 USPQ2d 1934, it is obvious to one of ordinary skill in the art to determine the optimum value of a cause effective variable such as the dimensions of the gas filled insulation chamber through routine experimentation. Thus, it would have been obvious for one of ordinary skill in the art at the time of the claimed invention to construct the gas filled chamber of Benjamin et al or Arai et al as modified by Strang et al to the optimal height to provide optimal thermal insulation between the thermal control elements, thus enhancing temperature control of the wafer.

Regarding claim 20: Benjamin et al or Arai et al fail to teach that the material of construction of the chamber comprises a support material different from the base.

Strang et al discusses material of construction of the chamber and base in [0048] and [0051]. Therein, Strang et al suggests that the materials of construction can be the same of different as long as the material of the chamber support material will function as a thermal insulator. The choice of a material of construction of the base and support material of the chamber is a matter of optimization. The selection of a known material based on its suitability for its intended use is prima facie obviousness. Sinclair & Carroll Co. v. Interchemical Corp., 325 US.327. 65 USPQ 297 (1945). Thus, it would have been obvious for one of ordinary skill in the art at the time of the claimed invention to construct the chamber support material different from the base is a mere matter of optimization.

12. Claims 16, 17, and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Benjamin et al.

Benjamin et al teaches thermal breaks 510(gas filled chambers) to separate and thermally insulate thermal control elements (denoted by T1 and T2), see also col. 6 lines 46-63. Benjamin et al fails to teach the dimensions of the chambers.

The motivation to modify the chamber of Benjamin et al *to design the chamber with a height that will provide optimal thermal insulation between the thermal control elements of their respective substrate holders.* According to In re Woodruff, 16 USPQ2d 1934, it is obvious to one of ordinary skill in the art to determine the optimum value of a cause effective variable such as the dimensions of the gas filled insulation chamber through routine experimentation. Thus, it would have been obvious for one of ordinary skill in the art at the time of the claimed invention

to construct the gas filled chamber of Benjamin et al to the optimal height to provide optimal thermal insulation between the thermal control elements, thus enhancing temperature control of the wafer.

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sylvia R. MacArthur whose telephone number is 571-272-1438. The examiner can normally be reached on M-F during the hours of 8:30 a.m. and 5 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on 571-272-1435. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Sylvia R MacArthur
Patent Examiner
Art Unit 1763

November 13, 2006